10 MINUTE SCHOOL

Robotics for Kids

Find your target
(Project 1)

Index

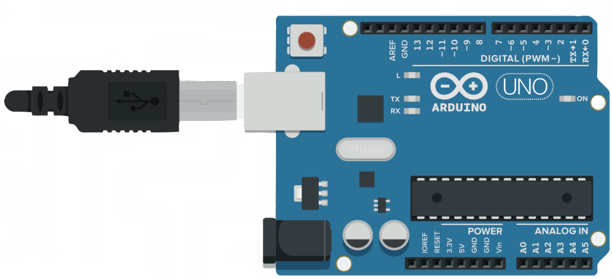
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What is radar system



Radar is an object detection system. It uses microwaves to determine the range, altitude, direction, or speed of objects. The radar can transmit radio waves or microwaves which bounce off any object in their path. So, we can easily determine any objet in the radar range.

Arduino is a single-board microcontroller to make electronics more discipline. The radar system has different performance specifications and also it comes in a verity of size.



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History of Radar

The history of radar (where radar stands for **Radio Detection And Ranging**) started with experiments by Heinrich Hertz in the late 19th century that showed that radio waves were reflected by metallic objects. This possibility was suggested in James Clerk Maxwell's seminal work on electromagnetism.



Inventor of radar: Robert Alexander Watson-Watt

Radar in **World War II** greatly influenced many important aspects of the conflict. This revolutionary new technology of radio-based detection and tracking was used by both the Allies and Axis powers in World War II, which had evolved independently in a number of nations during the mid 1930s

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PURPOSE OF USING RADAR

- Detecting an object
- Using 180 degree angle and surface
- Locating any object or person via 180 radar
- Observing the angle and the position of the object using the rotation of servo



Equipment

Software

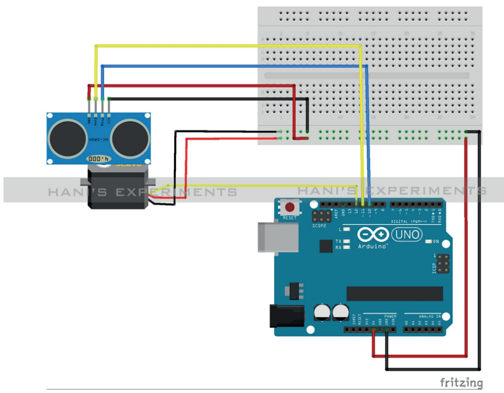
- Computer Arduino IDE
- Processing Software
- Proteus Software/fritzing/ tinkercad

Hardware

- Arduino Uno
- Sonar Sensor
- Servo Motor_SG90
- Bread Board
- PVC Board
- Connecting Wires
- Jumper Cables
- USB power Cable for Arduino

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Radar circuit



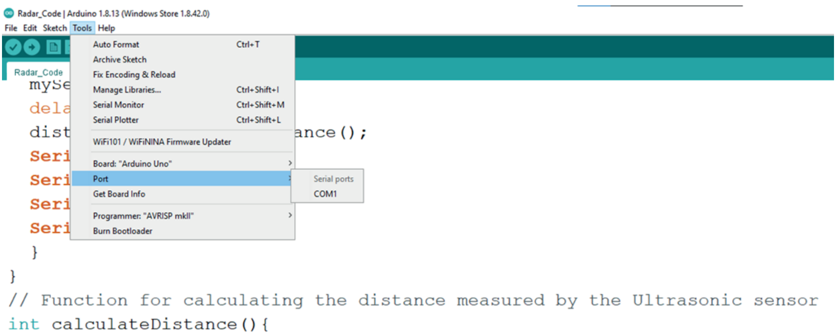
Download IDE



Choose your operating system

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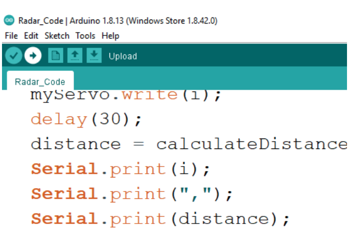
Select the com port and Mark

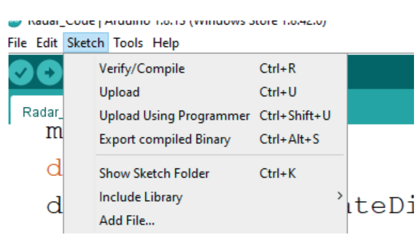


Go to Tolls → Port → Serial Ports → COM1
(The 'COM' – Which will show in your IDE, You've to select

Uploading

1. Click this icon





3. Ctrl + U, direct upload (Shortcut Method)

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Radar code

```
// Includes the Servo library
#include <Servo.h>.
// Defines Tirg and Echo pins of the Ultrasonic Sensor
const int trigPin = 10;
const int echoPin = 11;
// Variables for the duration and the distance
long duration;
int distance;
Servo myServo; // Creates a servo object for controlling the servo motor
void setup() {
 pinMode(trigPin, OUTPUT); // Sets the trigPin as an Output
 pinMode(echoPin, INPUT); // Sets the echoPin as an Input
 Serial.begin(9600);
 myServo.attach(12); // Defines on which pin is the servo motor attached
}
void loop() {
 // rotates the servo motor from 15 to 165 degrees
 for(int i=15;i<=165;i++){
 myServo.write(i);
 delay(30);
 distance = calculateDistance();// Calls a function for calculating the distance measured by the Ultrasonic
sensor for each degree

 Serial.print(i); // Sends the current degree into the Serial Port
 Serial.print(","); // Sends addition character right next to the previous value needed later in the Processing
IDE for indexing
 Serial.print(distance); // Sends the distance value into the Serial Port
 Serial.print("."); // Sends addition character right next to the previous value needed later in the Processing
IDE for indexing
 }
 // Repeats the previous lines from 165 to 15 degrees
 for(int i=165;i>15;i--){
 myServo.write(i);
 delay(30);
 distance = calculateDistance();
 Serial.print(i);
 Serial.print(",");
 Serial.print(distance);
 Serial.print(".");
 }
}
// Function for calculating the distance measured by the Ultrasonic sensor
int calculateDistance(){

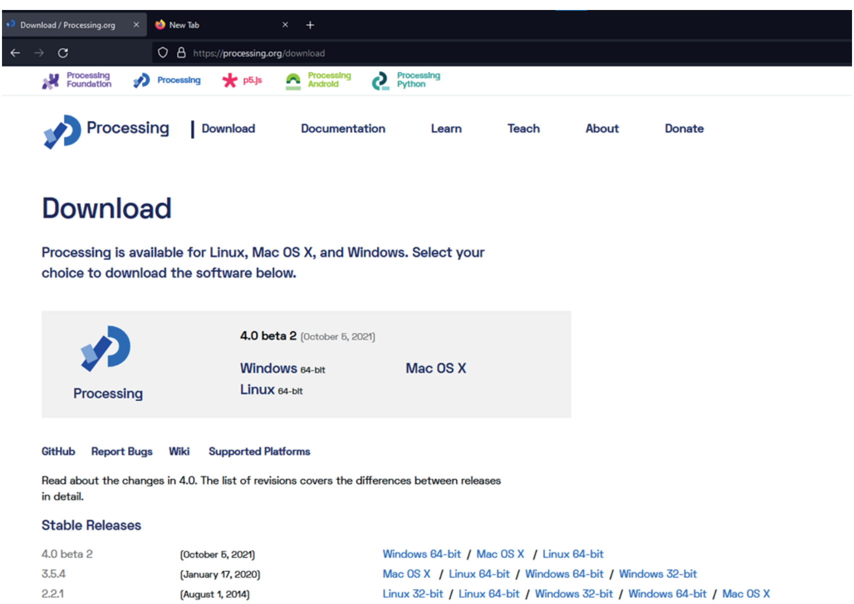
 digitalWrite(trigPin, LOW);
 delayMicroseconds(2);
 // Sets the trigPin on HIGH state for 10 micro seconds
 digitalWrite(trigPin, HIGH);
 delayMicroseconds(10);
 digitalWrite(trigPin, LOW);
 duration = pulseIn(echoPin, HIGH); // Reads the echoPin, returns the sound wave travel time in microsec-
onds
 distance= duration*0.034/2;
 return distance;
}
```

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Download processing



Choose your operating system



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Upload the code

My_Radar_window | Processing 4.0b1

File Edit Sketch Debug Tools Help

My_Radar_window

```
import processing.serial.*; // imports library for serial communication
import java.awt.event.KeyEvent; // imports library for reading the data from the serial port
import java.io.IOException;
Serial myPort; // defines Object Serial
// defubes variables
String angle="";
String distance="";
String data="";
String noObject;
float pixsDistance;
int iAngle, iDistance;
int index1=0;
int index2=0;
PFont orcFont;
void setup() {

 size (1200, 700); // ***CHANGE THIS TO YOUR SCREEN RESOLUTION***
 smooth();
 myPort = new Serial(this,"COM10", 9600); // starts the serial communication
 myPort.bufferUntil('.'); // reads the data from the serial port up to the character '.'. So actually it reads this: angle,distance.
}
void draw() {

  fill(98,245,31);
  // simulating motion blur and slow fade of the moving line
  noStroke();
  fill(0,4);
  rect(0, 0, width, height-height*0.065);

  fill(98,245,31); // green color
  // calls the functions for drawing the radar
  drawRadar();
  drawLine();
  drawObject();
  drawText();
```

Confirm the port

My_Radar_window | Processing 4.0b1

File Edit Sketch Debug Tools Help

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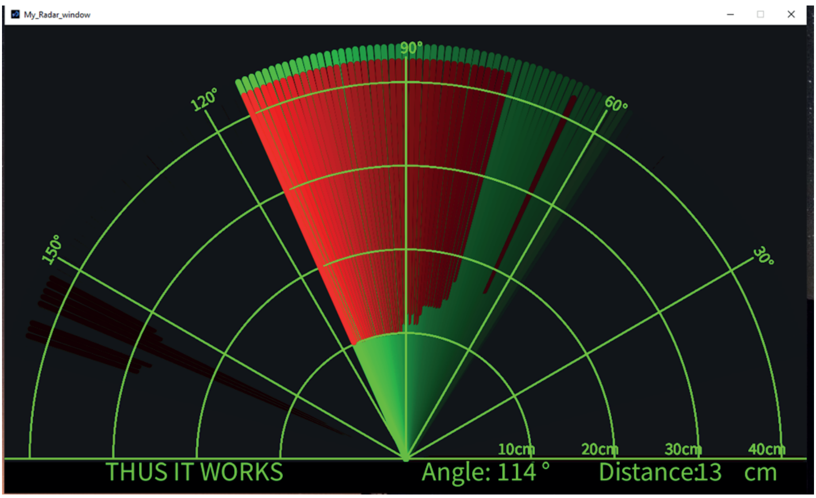
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It can be COM1/COM2/COM3 etc.

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Your Radar window



Resources

Arduino IDE download link
processing download link